User's manual

Advanced Electronic/Air Column PC-2200

Version 2.06

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APPENDIX A. REPLACING EPROM & CPU

APPENDIX B. MENU MAP

CHAPTER 1. INTRODUCTION

1.1 GENERAL INFORMATIONS

- The column PC-2200 is an instrument system that measures and displays “ID, OD, Length related measurements such as misalignment, and others” in automotives, machines, electrical and electronic parts, and determines whether the measured results are acceptable or not.

- The user can identify the measurement values correctly and easily as the display is made on a 3-Color LED Bar (green, orange, red) and a DOT MATRIX LED (8 characters) mounted in the front side.

- The Status panel, positioned on the front bottom side, shows the current operating status in regards to the unit system (mm/inch) and operating sets (M1, M2, M3, M4) using 12 LED’s (green).

- The Keypad, consists of 9 membrane switches mounted below the Status panel, performs the user program such as the system setup. The user can build the program environment that can satisfy the user’s requirements to the maximum through the Keypad operation such as selecting the menu in easy and free way and setting up the required variables.

- The rear upper side is configured as the AC power switch, Fuse holder, AC power inlet and Aux. power supply, and therefore, it can use several units of PC-2200 through connecting with only one unit of power supply. The AC power of AC 110/230 V and 50/60 Hz is applied. You can select the power source of 110V/230V (default : 110V) by inserting the connector on the DC power PC board that is fixed on the upper side of the system inside.

- With the 5 external interfaces on the rear center side, the column can be connected to another column, PC, Printer, PLC or CNC.

- You can use the HBT, LVDT and CAPACITIVE probes as electronic system or AIR probes through the analog board on the rear bottom side. You should install the analog board (PCB) dedicated by the type of probe.

- The PC-2200 is an integrated high quality measurement system that performs various measurements and display functions such as inter-channel operations up to 4 channels and dynamic mode in addition to the simple displays of measurement values.

1.2 TECHNICAL SPECIFICATIONS

General :

Storage temperature	: -40°C to 60°C /- *40°F to 140°F*
Operational temperature	: 0°C to 50°C / *32°F to 122°F*
Power supply	: 110/230V (AC) 50/60Hz
Max. consumption	: 40VA
Fuse	: 2A delayed
MTBF (Mean Time between Failure)	: >100'000 hours
Average life of display	: > 50'000 hours

Performance :

Time for stabilization after switching ON	: 5 minutes
Measurement thermal drift	: 100PPM/°C
Measuring thermal drift between channels	: 30PPM/°C
PC-2200 equiped with HBT-LVDT-CAP probes Measuring accuracy at 20°C / *68°F* Resolution = 0.1 µm / *.00001''*	: ± 0.5% ± Resolution
PC-2200 equiped with Air System in the nominal conditions Working range	: ± 50µm / *.002''*

Interfaces :

Analog **OUTPUT** Range	: ± 5.0V F.S.
Full scale accuracy:	: 2% of full scale

Serial OUTPUT (RS 232)

Type	: RS 232 C
Transmission speed (Baud rate)	: 4800, 9600, 19200
Word length	: 7 or 8
Parity control	: NONE, EVEN, ODD

DC-OUT Photo couplers

Maximal Voltage	: 50V
Maximal Tension	: 60mA

Weight and Dimensions :

Dimensions (height * width * depth)	: 450 * 57 * 215mm / *17.7''*2.16''*8.66''*
Weight	: 4.12 kg

1.3 COLUMN DESCRIPTION

Front View

Bar scale

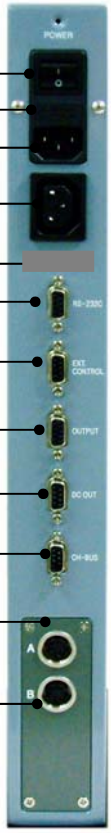
3-color LED-bar(103ea)
Green, orange, red

Display (LED)
(8 chr.)

Status panel
12 (LED)

Keypad
9 Keys

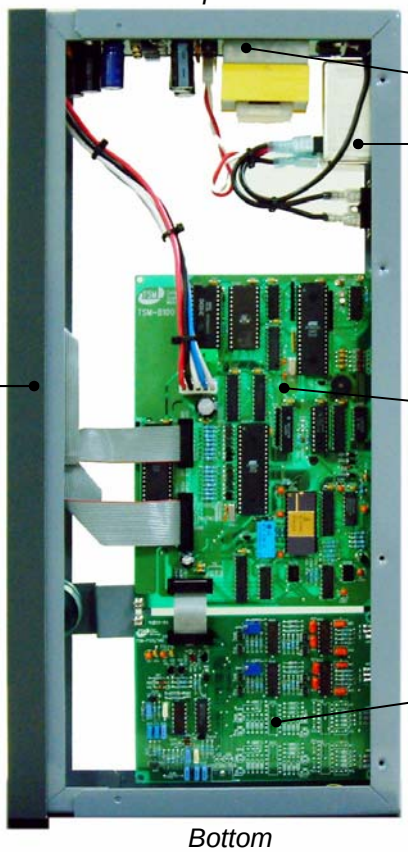
Rear View



ON-OFF Switch
Fuse 2A
AC power line input
Auxiliary power line (for other column)
Identification and serial numbers
RS 232 C Interface
External Control Interface
OUTPUT Interface (class)
DC OUT Interface (V)
CH-BUS Interface (signal transfer)
Identification analog board
Analog board for
(HBT, LVDT,CAPACITIVE,AIR)

Internal View

Top



DC Power PCB
Noise filter module
Display (PCB)
Main board PCB
Front
Rear
Analog board PCB

Bottom

1.4 KEYPAD CONFIGURATION

Move upward
Measuring mode
Select M1, M2, M3, M4
Programming mode
Used to move from a specific menu to other menu, or to increase the values when setting the values of variables.

Program
Measuring mode
Access to the programming mode
Programming mode
No function

Escape
Measuring mode
Initialization of dynamic mode
Programming mode
Escape to previous menu.

Move left
Measuring mode
Send data
Programming mode
Used to move from a specific menu to other or move the selected LED to the next left LED

Move right
Measuring mode
No function
Programming mode
Used to move from a specific menu to other or move the selected LED to the next right LED

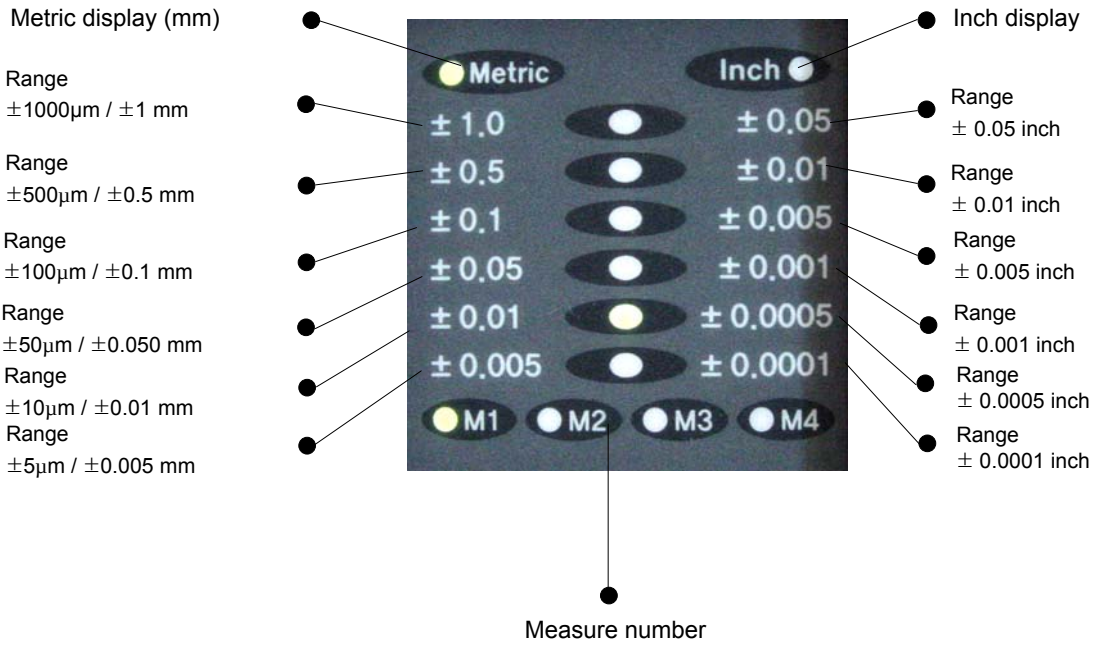
Calibration
Measuring mode
Calibration functions
Programming mode
No functions

Move downward
Measuring mode
No function
Programming mode
Used to move from a specific menu to other menu, or to decrease the values when setting the values of variables.

Preset
Measuring mode
Used to set the current measured values to 0 or pre-selected values
(See page 20)
Programming mode
No function

Enter
Measuring mode
Instrument OFF
Enter + ON = **Reset**
Programming mode
Used to select the current menu or to set values of variables

1.5 STATUS PANEL



Chapter 2. Installation

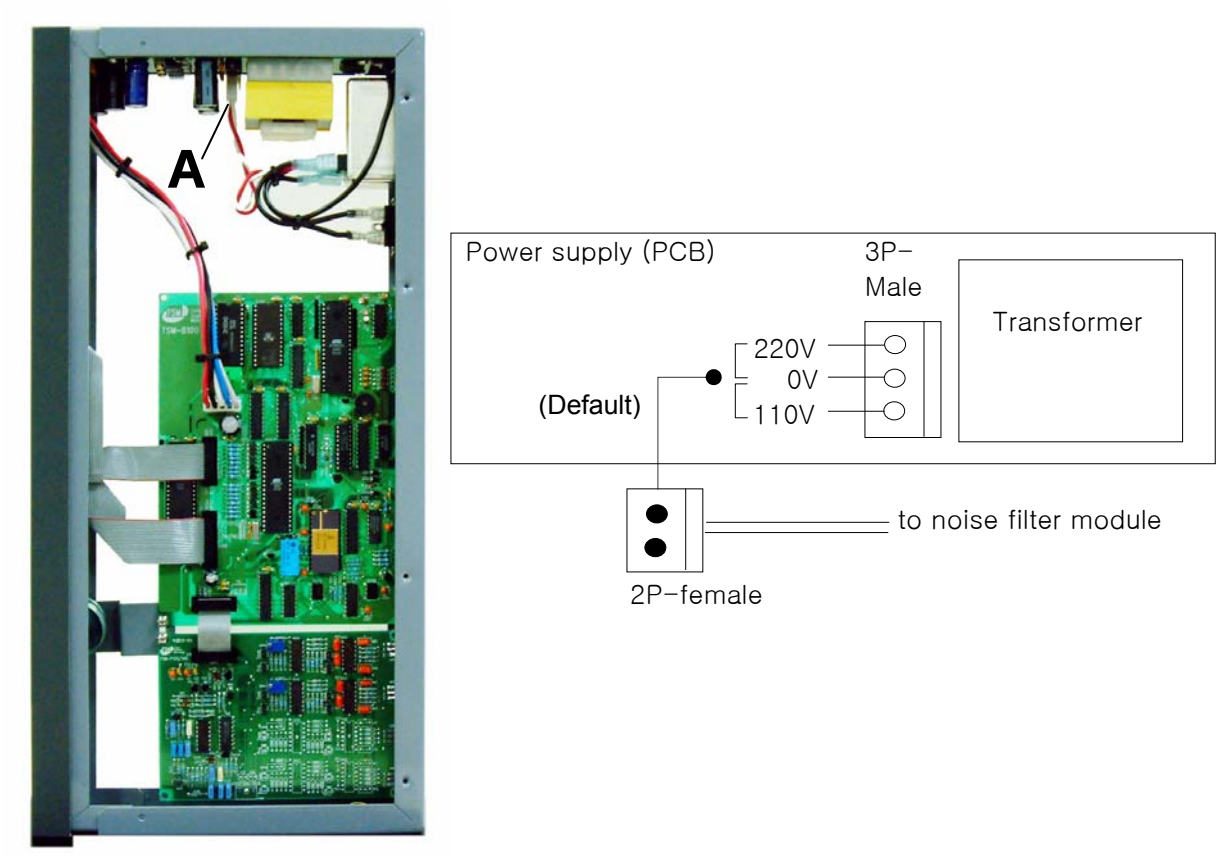
2.1 MECHANICAL INSTALLATION

Fix the column on the aluminum base and lock it with the 2 screws (M6 x16)
Connect the power supply cable (**A**) .
Connect the probe cable to the analog board (**B**)
Switch (**ON**) I.

2.4 ELECTRICAL INSTALLATION

Switching the Voltage from 230V(110V) to 110V(230V).

Remove the cover by unscrewing the 8 screws.
Move the connector A on 110V or 230V.



Chapter 3. HOW TO USE IT

3.3 SWITCHING ON THE COLUMN

To start the first time, we advise to make a general **RESET** .

Press Enter + **ON** simultaneously,

Do not release your pressure on Enter before the message RESET appears on the display, then a test program will start.

The default parameters are :

CHANNEL : Source : **Ext.** - **CH-A** Ratio :**1.000** Direc. **+**
MEASURE : **M1** – Bar :**Bottom** B.fact. **1.00** – Range : ± 0.05**"** Sens : **1.000** Resol.:**0.00005"** – Func: **A –** Mode: **STATIC**
SPEC. : M1 – NOMI. **000.0000** - -TOLER **–0.0500** - +TOLER **+0.0500** –APPROCH **–0.0500** + APPROCH : **+0.0500**
MASTER : M1 - -MASTER **+0.00000** +MASTER **+0.00000**
CLASS : **OFF**
RS232 : SPEED **9600**, DATA **8**, PARITY **N**, TERM **CRLF**, RTS **ON**, PRINT **BRIEF**, RSMODE **PRINT** ID NO. **000**
ETC : GENERAL UNIT **INCH**, DISPLAY **mm**, INPUT **HBT**, P/W PROGRAM **0000**, CALIBR **OFF** AVERAGE BAR **005**, DIGIT **005**, A/D **20** VERSION **V2.xx**

The above parameters are the default values, so it is necessary to modify the values according to your application.

Description of functions per menu

CHANNEL : Select the source and the probes used with ratio and measuring direction.

MEASURE : Select the starting position of the bar, Bar factor, Range of the Bar, Resolution of the digital display, Combination of probes, Static or Dynamic measuring mode.

SPEC. : Store the nominal size, the upper tolerance, the lower tolerance, the upper warning limit, the lower warning limit of the component to be measured.

MASTER : Store the lower master value and the upper master value used.

CLASS : Active the classification mode, class number, starting value, class range.

RS232 : Select the transmission speed, word length, parity control, end of characters, request to send signal, printing mode, simplex or duplex mode, identity number.

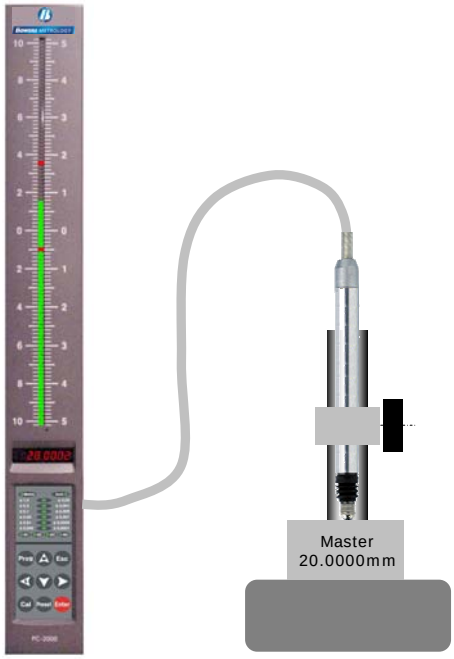
ETC
GENERAL : Select the unit (mm or inch), type of display (mm or um), type of probes used, program and calibration password.

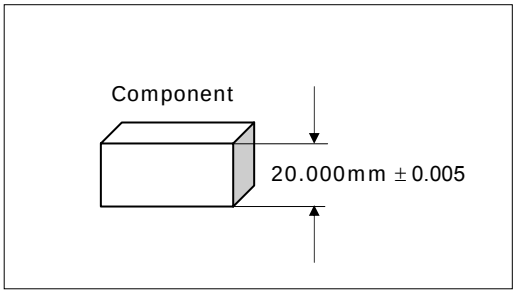
AVERAGE : Select the bar sensitivity , the display sensitivity, the analog board sensitivity.

VERSION : Show the software version.

3.2 PROGRAMMING A SIMPLE MEASURE

Example N°1
Measure a component with a HBT probe connected to channel A.





USING a HBT probe, we do not use the calibration, this mode will be explained in a subsequent chapter.

Step n°1 is to place the probe into a correct position to be able to get the maximum range and the minimum deviation.
Place the master 20.0000 mm on the stand, place the probe into position.
Press simultaneously S + ▶ | A D J U S T | Enter | C H - A | Enter | - 1 . 0 5 0 0 |
Move the probe down to the electro-mechanical zero, | - 0 . 0 0 1 0 | , then approximately stop around zero, lock the probe . Press Esc to escape to the measuring mode.

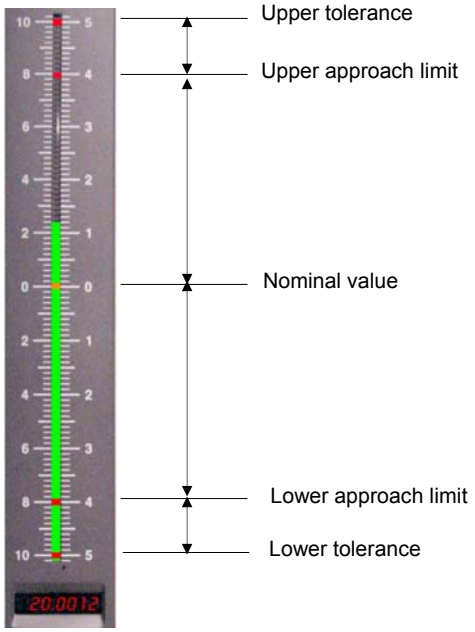
Parameters to be changed for example number 1

MEASURE : **M1** –Range : ***±0.01****mm* Resol.:***0.0002****mm* –

SPEC. : M1 – NOMI. ***020.0000*** - -TOLER ***–0.0050*** - +TOLER ***+0.0050*** –APPROCH ***–0.0040***
+ APPROCH : ***+0.0040***

3.3 PROGRAMMING A PART (EXAMPLE 1)

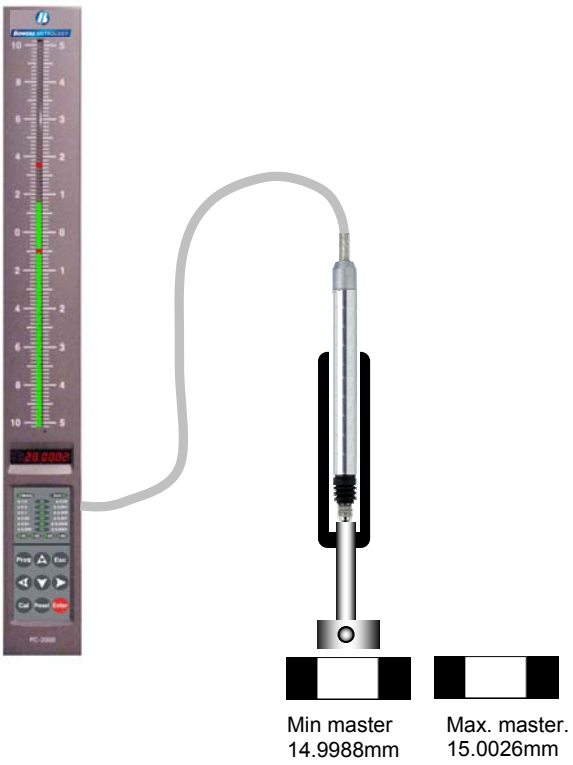
Place the master 20.0000mm in contact with the probe, then press Preset PRESET Enter

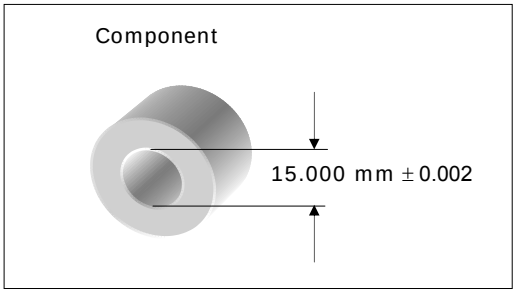


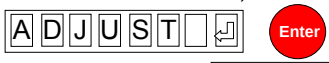
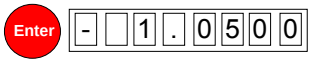
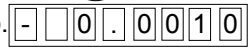
The approach limit should be within the tolerance.

3.4 PROGRAMMING A DIAMETER

Measurement of a diameter with a HBT probe connected to channel **A**.





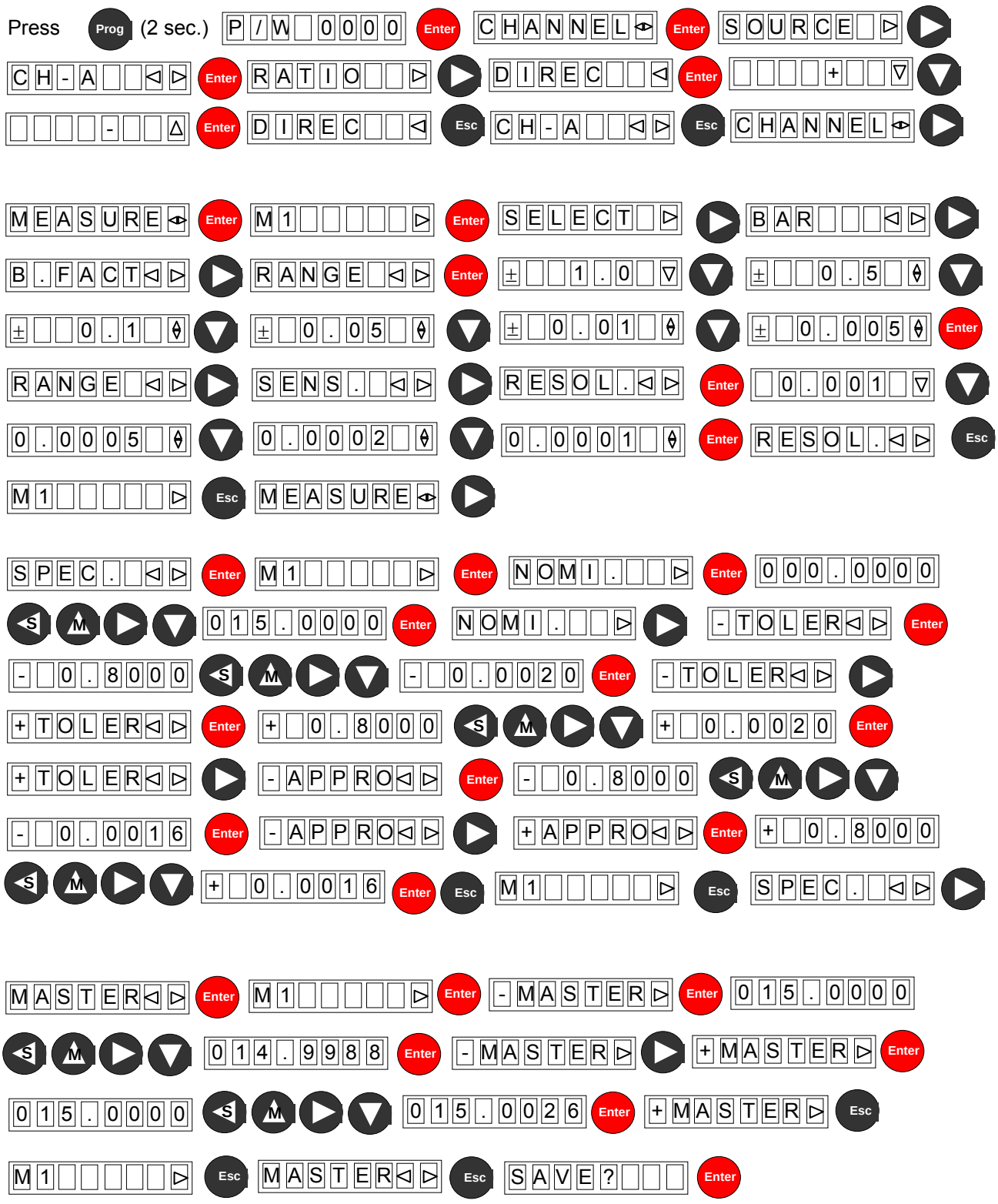
Step n°1 is to place the probe into a location to be able to get the maximum range and the minimum deviation.
Place the measuring head of 15.0000 mm in the master,
Press simultaneously  
Move the probe down to the electro-mechanical zero.  , then approximately stop around zero, lock the probe . Press to escape to the measuring mode.

Parameters to be changed for example number 2

CHANNEL : Direc. **-**
MEASURE : **M1** –Range : ***±0.005*** *mm* Resol.: ***0.0001****mm* –

SPEC. : M1 – NOMI. ***015.0000*** - -TOLER ***–0.0020*** - +TOLER ***+0.0020*** –APPROCH ***–0.0016***
+ APPROCH : ***+0.0016***
MASTER : **M1** - -Master : **14.9988mm** - +Master : **15.0026mm**

3.5 PROGRAMMING A PART (EXAMPLE 2)



The Calibration
Example N°2
The parameters are now stored. The automatic calibration can be started.

Cal | CAL..M1▷ | Enter | CAL.____ | place the measuring head in the lower master. | Enter

CAL.____ | place the measuring head in the upper master. | Enter | ___0.981

The sensitivity is calculated automatically.

If the message MIN OVER appears, that means that the value between the two masters is bigger then the calculated value.

Cal | CAL..M1▷ | ▶ | MODULE◁▷ | Enter | M1_____▷ | Enter | CAL%___◁ | ▶

VALUE__◁ | Enter | ____000%

NONE : All sensitivity values are allowed.
000% : The sensitivity value will not be accepted if the calculated value during the calibration is different from the stored value.

XXX% : The sensitivity value will not be accepted if the calculated value during the calibration is different from XXX% of the stored value.

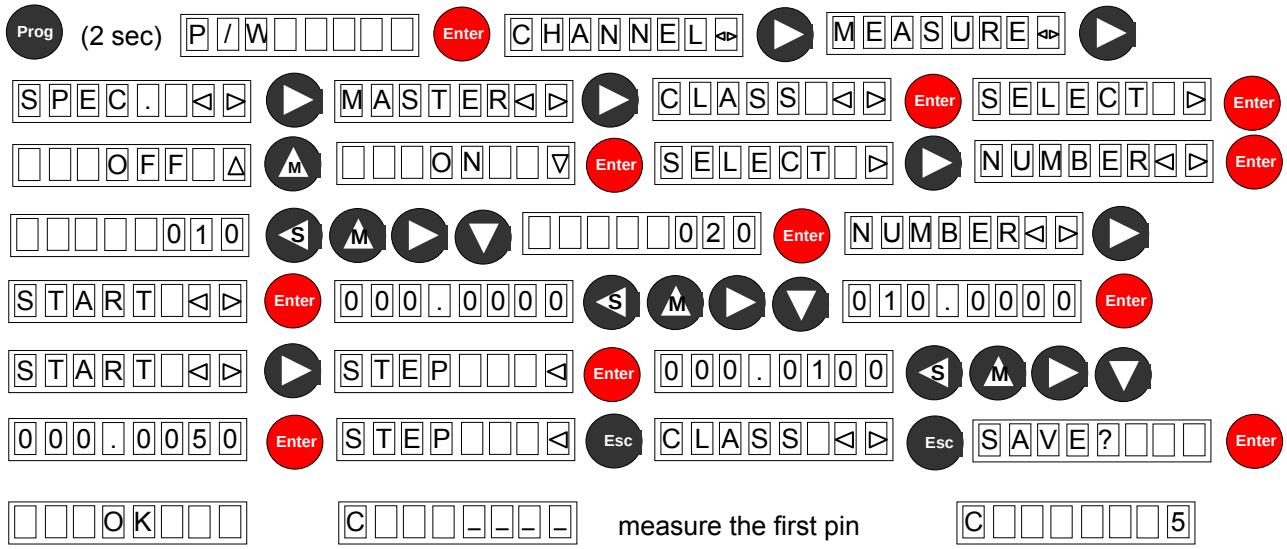
After the calibration the measurement can be started.

3.6 THE CLASSIFICATION MENU

CLASS

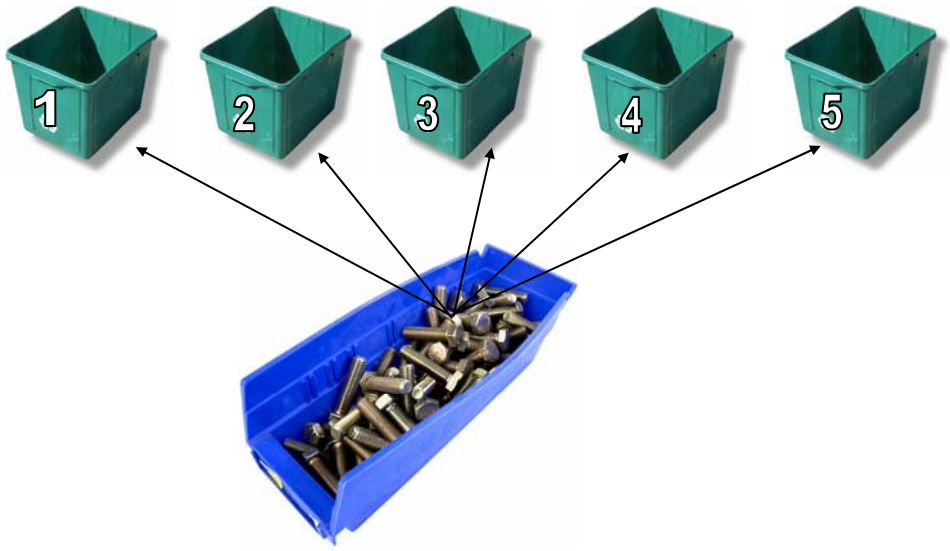
The class menu is used separately.

Example : Pin dia. 10mm - 0 +0.100mm to be classified by steps of 0.005mm , in 20 classes, starting from 10.0000 mm.



The first pin will be classified into class 5, and the printed value will be between 10.025 and 10.030 mm

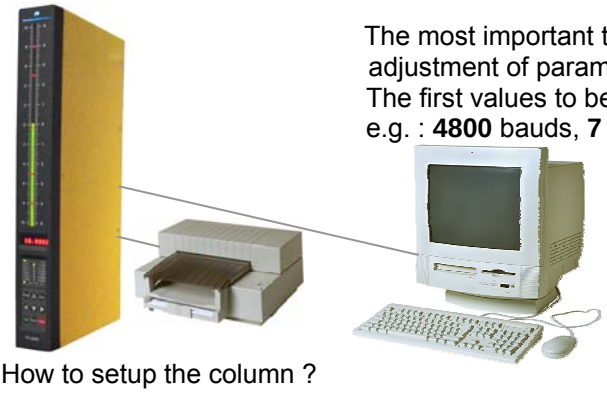
To escape from the Class menu, SELECT. **OFF**



3.2 THE RS232 INTERFACE

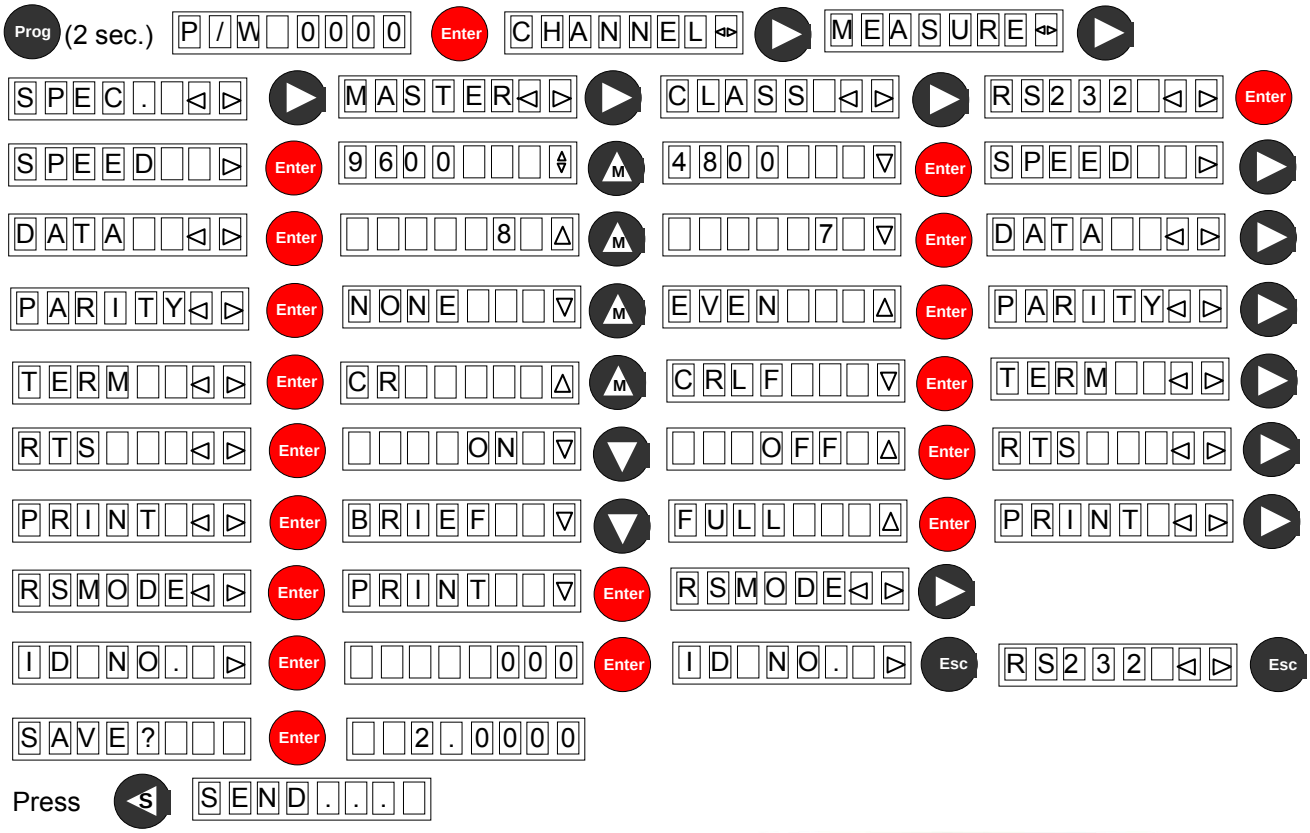
The RS 232 Interface allows to send the data to a printer, as well to a PC, also allows to modify the stored parameters in the column with the help of the communicator software.

How to connect a PC-2200 to a **serial** printer.

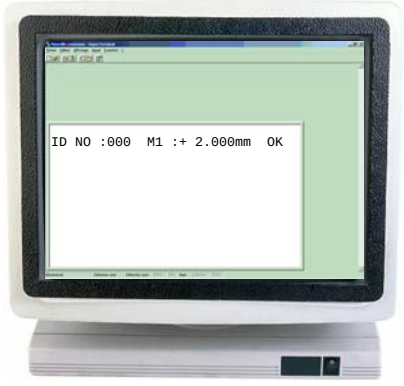


The most important to connect a column to a printer or a computer is the adjustment of parameters.
The first values to be known are the serial printer parameters.
e.g. : **4800** bauds, **7** bits, parity **even**.

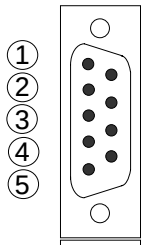
How to setup the column ?


Prog (2 sec.) P/W 0000 Enter CHANNEL MEASURE
SPEC. MASTER CLASS RS232 Enter
SPEED 9600 M 4800 Enter SPEED
DATA Enter 8 M 7 Enter DATA
PARITY Enter NONE M EVEN Enter PARITY
TERM Enter CR M CRLF Enter TERM
RTS Enter ON OFF Enter RTS
PRINT Enter BRIEF FULL Enter PRINT
RSMODE Enter PRINT Enter RSMODE
IDNO. Enter 000 Enter IDNO. Esc RS232 Esc
SAVE ? Enter 2.0000
Press S SEND....

```
ID NO :000  M1 :+ 2.000mm  OK
```



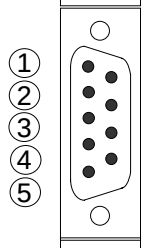
3.1 LAYOUT OF IN/OUTPUT



RS-232 C

Pin#	Functions
1	* (not connected)
2	Rxd
3	Txd
4	Vcc
5	Gnd
6	* (not connected)
7	Rts
8	Cts
9	Gnd

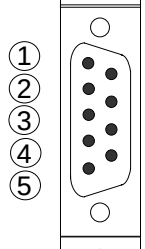
(*Connection of a serial printer or a PC*)
In the case of RS232-RS mode is set as "**PRINT**", the display value is printed via the RS232 by connecting the pins #1,9 of external control..
If the RS 232-RS mode is set as « **HOST** », the communication becomes (duplex) and allows to use the communicator software.



EXT.CON

Pin#	Functions
1	RS 232 sortie (0.5 sec.)
2	Current value display
3	Dynamic/Static
4	M1->M2->M3->M4
5	Hold measure
6	* (not connected)
7	* (not connected)
8	* (not connected)
9	Gnd

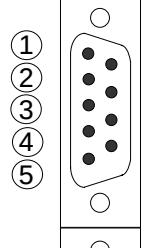
The external control functions can be activated by connecting the pins #1 to 5 to the pin #9(GND) according to the required function.
The following functions can be activated by connecting the pin #9 to pin # (foot pedal, box)
#1)Print the display value. #2) Change dynamic mode to static mode
#3) Reset the dynamic mode (min., max.) #4) Move the measurement mode (M1) to M2,…… M2,M3,M4 should be active. (ON)
#5) Freeze the displayed value.
Active the preset mode by connecting the pin #3 and #5 simultaneously



OUTPUT

Pin#	Functions	Class Mode (Binary)
1	O.K (Green)	Bit 0
2	* (not connected)	Bit 1
3	Approch + (Orange)	Bit 2
4	+N.G (Red)	Bit 3
5	* (not connected)	Bit 4
6	Approch – (Orange)	Bit 5
7	-N.G (Red)	Bit 6
8	Drive Voltage	
9	Gnd	

Active the contact with GND pin#9 when the value of the bar is positioned in the corresponding range pins #1, 3, 4, 6, 7) .
This application shows if the product is acceptable or not with an external unit such as lamps, relays, by powering the pins #8,9.
If the Class mode is turned on, the judgement mode(OK, +/-NG, etc.) is automatically turned off and the data is output with BCD code through the same port(each pin).(Refer to the chapter 3.6 for setting up.)

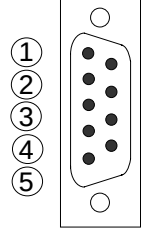


DC OUT

Pin#	Functions
1	D/A sortie
2	* (not connected)
3	* (not connected)
4	* (not connected)
5	* (not connected)
6	* (not connected)
7	* (not connected)
8	* (not connected)
9	Gnd

Analog output of the display (Signal Voltage (pin #1 and #9).

The voltage range is : Approx. ±4.3V with ±1 mm, or ±0.05 inch

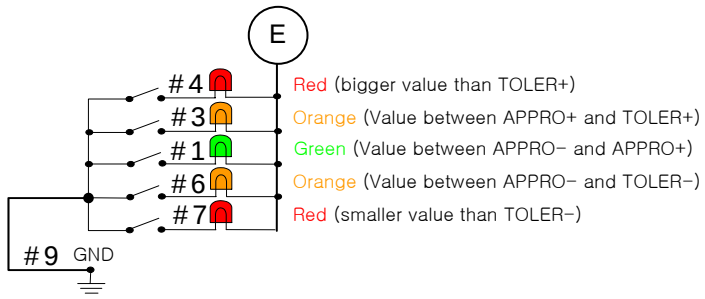


CH-BUS

Pin#	Functions
1	Ex-A
2	Ex-B
3	Ex-C
4	Ex-D
5	Gnd
6	* (not connected)
7	* (not connected)
8	* (not connected)
9	Gnd

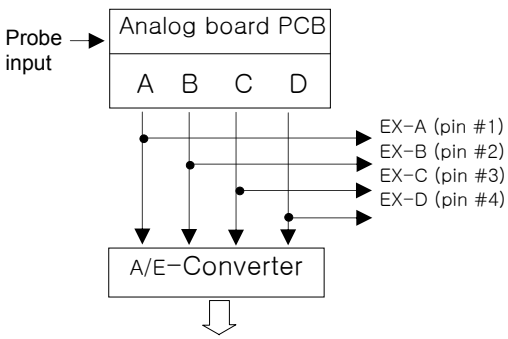
This function is used when the signal of a probe should be shifted to a second column.
Application : Example : Display a maximum value on 1 column and a minimum value to the other column with only one probe..
The analog board of the column which is receiving the data should be disconnected,.

Circuit connection diagram (OUTPUT)



E=External voltage

CH-Bus diagram



Display controller

Chapter 4. Functions

Definition of keypad functions per menu

4.1 THE MEASURING MODE FUNCTIONS

			Functions	Functions
Prog		Access to programming mode		
M		"M" Change the measure number (M1-M2) only if M2,M3,M4 (**ON**)	M1-M2-M3-M4	
Esc				
S		"S" send the displayed value to RS232		
▼		No function in measuring mode		
▶		No function in measuring mode		
Enter		Simultaneously when switching (**ON**)	RESET	
Preset	Preset Value M1 00.0000	Access to preset mode Value = Norm. value + Meas. range.	PRESET	Maximum +/- 0.05"
Cal	Calibration Module M1, M2, M3,M4 CAL%	Cal. Min__ and Max ‾‾ Cal. by measure M1, M2, M3, M4 NONE, Value XXX%		

4.2 THE PROGRAMMING MODE FUNCTIONS

	Menu	Sub-menu	Functions	Functions	Functions	Functions
Prog	**CHANNEL**	SOURCE	***EXT.*** ***CH-BUS***			
		CH-A	RATIO	***1.000***	DIRECT	**+ / -**
		CH-B	RATIO	***1.000***	DIRECT	**+ / -**
		CH-C	RATIO	***1.000***	DIRECT	**+ / -**
		CH-D	RATIO	***1.000***	DIRECT	**+ / -**

SOURCE : **EXT**. Select the source of the probe on the analog board on this column.
CH-BUS. Select the source of the probe from another column thru the CH-BUS.
CH-A : Select the ratio value and measuring direction for the channel A.
CH-B : Select the ratio value and measuring direction for the channel B.
CH-C : Select the ratio value and measuring direction for the channel C.
CH-D : Select the ratio value and measuring direction for the channel D.

	Menu	Sub-menu	Functions	Functions	Functions
Prog	**MEASURE**	M1	ON	BAR B. FACT RANGE SENS. RESOL. FUNC MODE	***BOTTOM,CENTER,-10->0*** ***1.00*** ***± 0.05, ±0.01, ±0.005, ± 0.001, ± 0.0005, ±0.0001*** **1.000** ***0.005,0.001,0.0005,0.0001,0.00005, 0.00002, 0.00001"*** ***A,B,C,D,A+B,A-B,C+D,(A+B)-C, (A+B+C)/3,(A+B+C+D)/4, (A+B)-(C+D)*** ***STATIC,MAXIMUM,MINIMUM, (M+m)/2,(M-m)/2,M-m.***
		M2, M3, M4	ON/OFF	…….	

M1,M… : Select the characteristics of the measuring result M1, it is possible to store 4 different measuring results (M1, M2, M3, M4). M2, M3, M4 should be (**ON**)
BAR : Select the starting position of the LED-bar, (BOTTOM) start from bottom, (CENTER) start from center, (-10->0) start from an excentred position in case of being out of range with the LED – bar.
B.FACT : Bar multiplication factor, giving the possibility of adjusting several column at the same level.
RANGE : Select the measuring range.
SENS : Calculated sensitivity value after calibration.
RESOL : Select the measuring resolution..
FUNC : Select the setting of measurement.
MODE : Select the dynamic or static mode

	Menu	Sub-menu	Functions	Functions	Functions
Prog	**SPEC.**	M1		NOMI. -TOLER +TOLER -APPRO +APPRO	***0.00000"*** ***-0.05"*** ***+0.05"*** ***-0.05"*** ***+0.05"***
		M2		……	***……***

M1,M.. : Store in measurement number 1, 2, 3, 4.
NOMI. : Store the nominal size
-TOLER : Store the lower tolerance.
+TOLER : Store the upper tolerance.
-APPRO : Store the lower warning limit.
+APPRO : Store the upper warning limit.

Prog	Menu	Sub-menu	Functions	Functions	Functions
	MASTER	M1	-MASTER +MASTER		***+0.00000"*** ***+0.00000"***
		M2	…..		……

M1,M… : Store in measurement number 1, 2, 3, 4.
-MASTER : Store the lower master value.
+MASTER : Store the upper master value.

	Menu	Sub-menu	Functions	Functions	Functions
Prog	**CLASS**	Select	ON/OFF	NUMBER START STEP	***000*** ***+0.0000"*** ***0.0000***

CLASS : Switch ON or OFF the class menu.
NUMBER : Store the number of classes to be used.
START : Store the starting nominal value
STEP : Store the step value of the class.

	Menu	Sub-menu	Functions	Functions	Functions
Prog	**RS232**	SPEED DATA PARITY TERM RTS PRINT RSMODE ID NO.			***4800,9600,19200 BAUD RATE*** ***7,8 Bits*** ***NONE, ODD,EVEN*** ***CRLF / CR*** ***ON / OFF*** ***BRIEF / FULL*** ***PRINT /HOST*** ***000***

SPEED : Select the transmission speed .
DATA : Select the word length.
PARITY : Select the parity control : none, even, odd
TERM : Select the end characters : CR, CRLF
RTS : (Request to Send) request to send a signal
PRINT : Select the printing mode, (BRIEF) send the minimum data, (FULL) send a complete protocol.
RS232 : Select the RS232 Interface in mode PRINT(Simplex) or HOST (Duplex)
ID NO : Store an identity number.

	Menu	Sub-menu	Functions	Functions	Functions
Prog	**ETC**	GENERAL	UNIT DISPLAY INPUT P/W	 PROGRAM CALIBR.	***METRIC, INCH*** ***mm or um*** ***HBT,LVDT,CAP_1,CAP_5,AIR*** ***0000*** ***ON/OFF 0000***
		AVERAGE	BAR DIGIT A/D		***005*** ***005*** ***20***
		VERSION			***v 2.xx BMI***

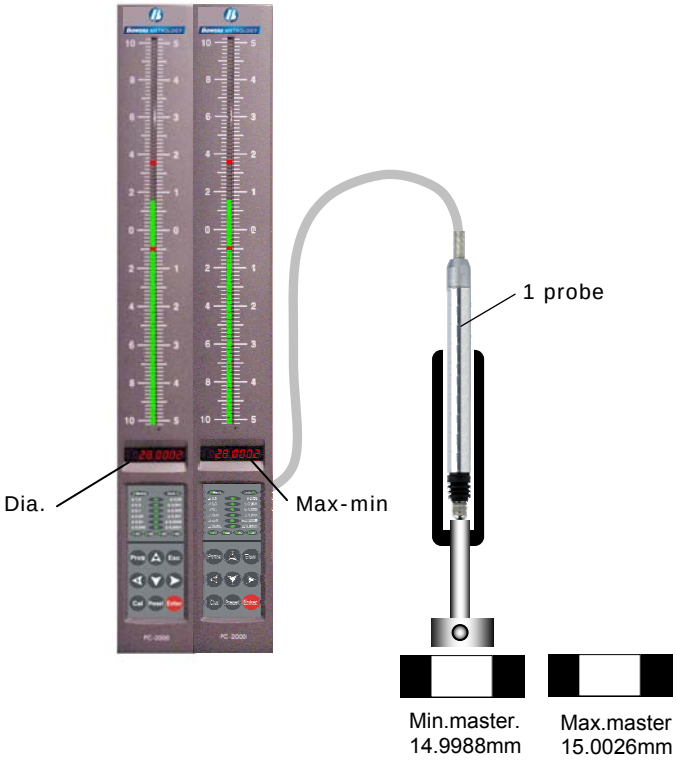
GENERAL : Select the measuring unit, select the display (mm or um), select the analog board used, store a PROGRAM password and a CALIBRATION password.
AVERAGE : BAR, Store a filter for the bar.
DIGIT, Store a filter for the digital display.
A/D, Store a filter for analog/digital converter.
VERSION : Show the software version.

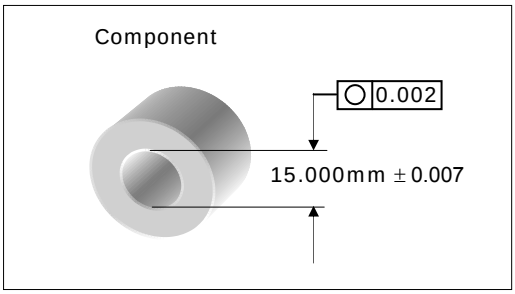
※ When changing the unit(metric to inch or inch to metric) it will be automatically out of the program without saving or confirming. The user should check the specification input after going into the program again.

4.3 CH-BUS APPLICATIONS

The CH-BUS channel transfers a data signal to another column.

Application.

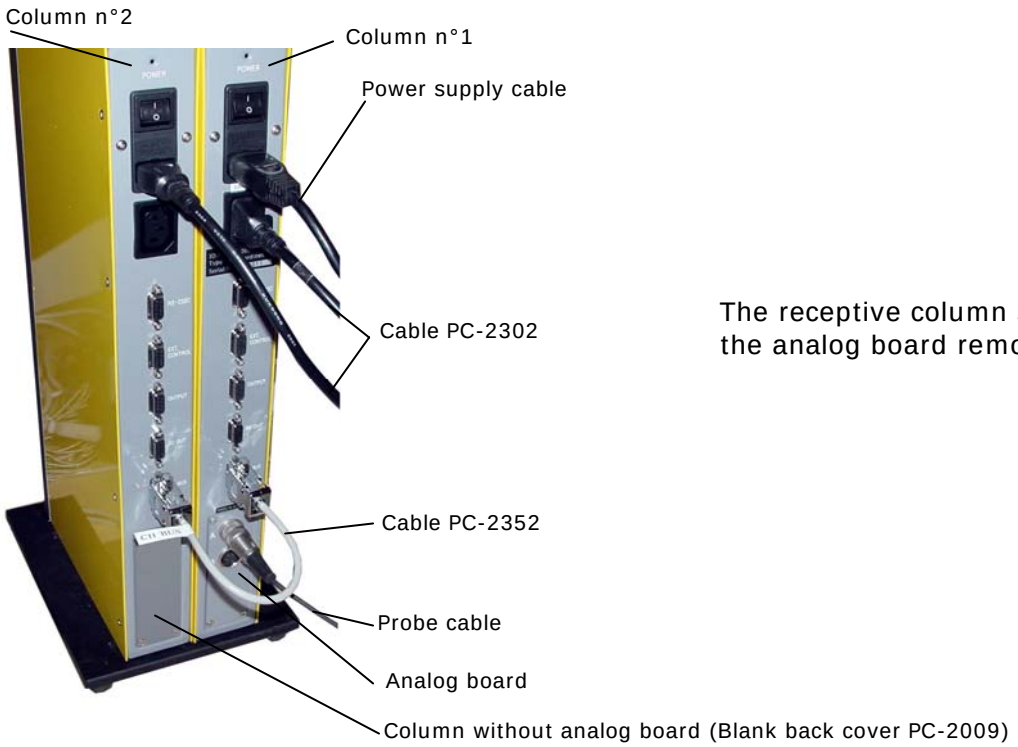




We need to see 2 values simultaneously.

1. Diameter 15.0000mm
2. max T.I.R 0.002mm

4.4 CH-BUS MECHANICAL INSTALLATION

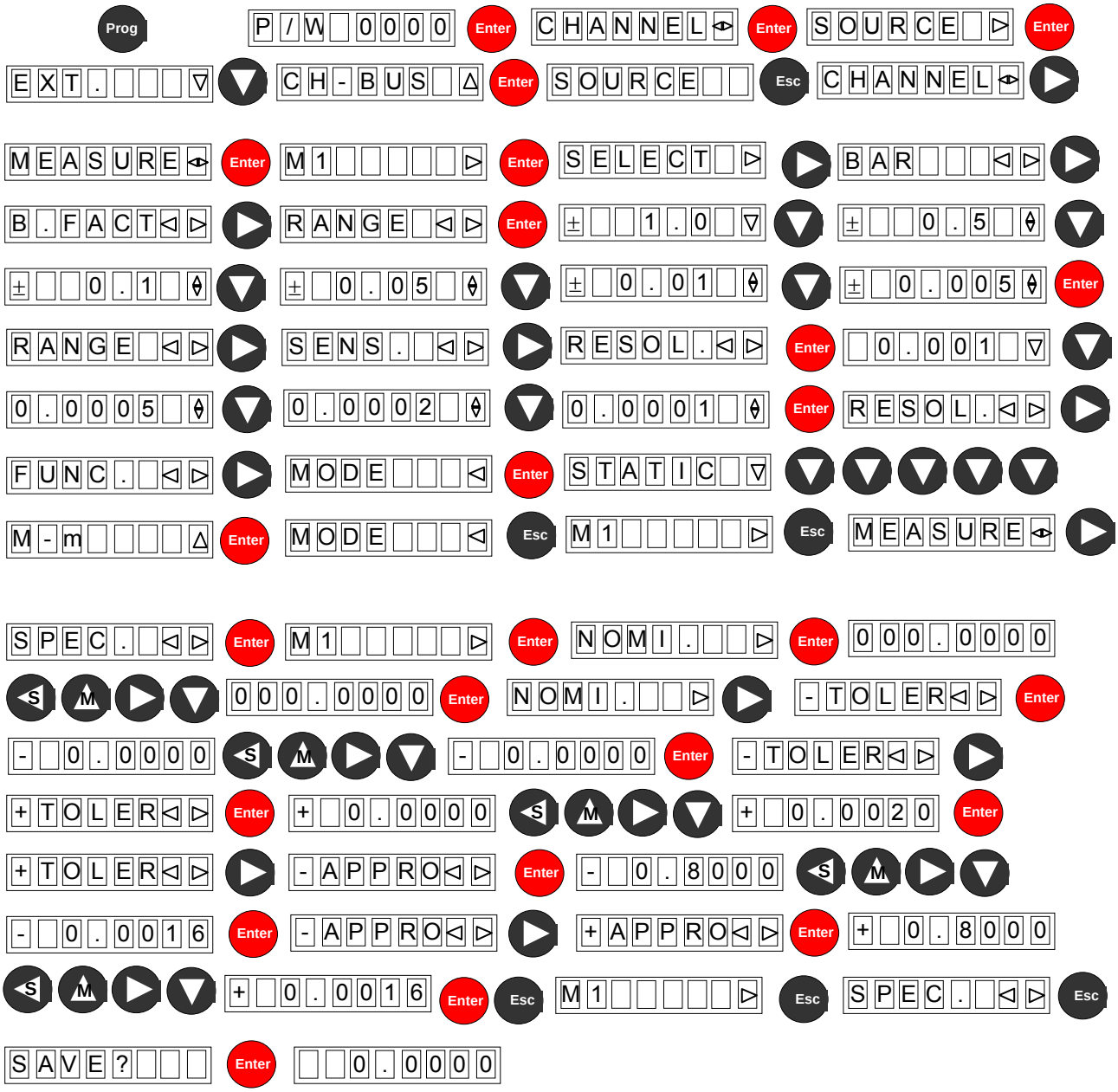


The receptive column should have the analog board removed.

4.5 PROGRAMMING THE CH-BUS

The column n°1 should be programmed like example n°2 on page n°15

Programming column n°2



Column n°1	Column n°2
15.0000	0.0000
Diameter 15.0000 mm	T.I.R 0.0020 mm

Chapter 5. PNEUMATIC INSTALLATION

Hose nipple for the air probe

1. Fix the column and the converter on the aluminum base.
2. Fix the hose of the air probe to nipple of converter.

Air supply hose nipple

Connection cable PC-2332.

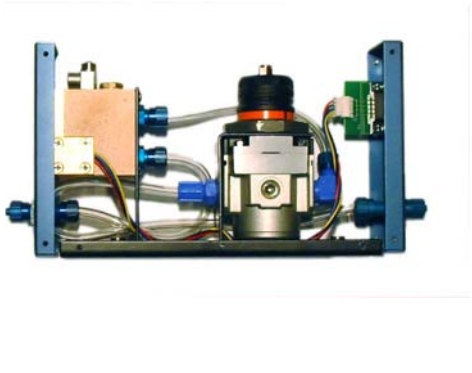
3. Connect the cable PC-2332 between the converter and the analog board.
4. Connect the air supply hose to the hose nipple on the converter.

Not less than 3 bar of air should be supplied.

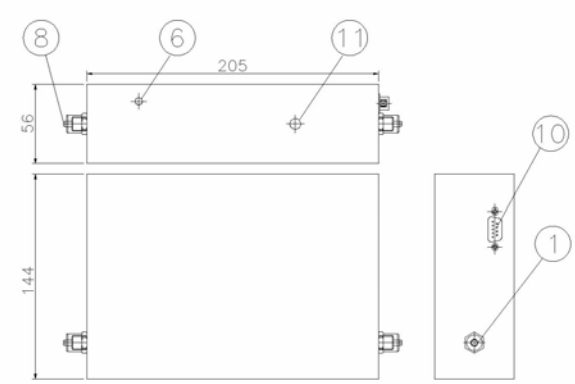
5.1 THE A/E CONVERTER

< Front View>

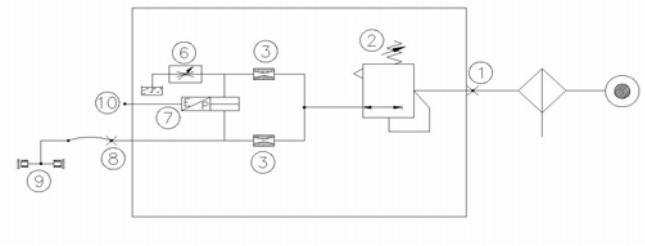
<Rear View>



<Internal View>



(View)



(Diagram)

Pressure source

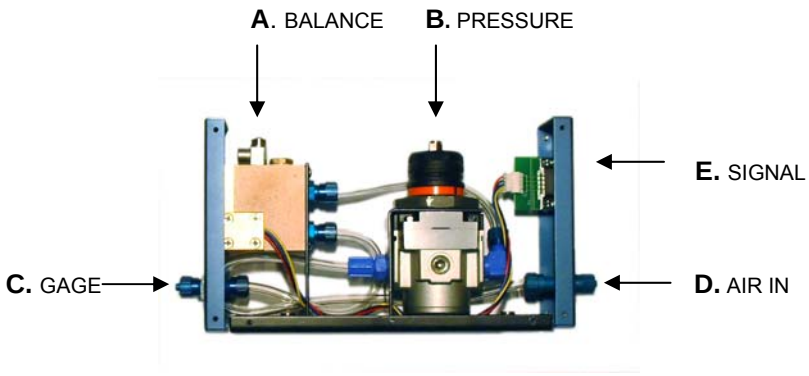
Filter

Connection

(2) Pressure regulator
(3) Preliminary nozzles
(6) Measurring adjustment nozzles (Measurring zero setting)
(7) Pressure transducer
(9) Measurring head.
(10) Connector (9−pin)
(11) Pressure setting hole

The programming procedure is similar to an electronic probe.

5.2 HOW TO SETUP FOR A/E CONVERTER



It is necessary to adjust the A/E CONVERTER in order to use this Column optimally.

1) Pressure Adjustment(STANDARD : 2 ± 0.1bar)

- Connect PRESSURE GAUGE to “C”.
- Connect AIR(Min. 3 bar) to “D”.
- Adjust pressure by turning “B” with screw driver.

♦ Default pressure is 2 bar(Factory setting).

2) Balance adjustment

- Connect the A/E converter and the Column with cable(PC-2332).
- Connect the air gauge to “C”.
- Stop supplying “D” with air.
- Preset the Column to “0” with the “PRESET” key.
- Place the air gauge into the Min. Master.
- Supply “D” with air.
- Adjust “A” with screw driver.

예) Example) Min. Master value : -0.020mm
DISPLAY VALUE : -0.020mm

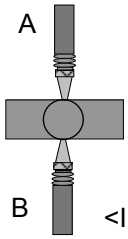
♦ **In case of unbalance, measuring range could be narrow.**

(1) Function: Initialize all stored data to the default values. **CAUTION** : All your stored data will be erased. Press Enter **+ ON**

6.1 TABLE OF DEFAULT VALUES

Menu	Sub-menu	Selection	Functions	Choice	Default value
CHANNEL	SOURCE	EXT.			**EXT.**
		CH-BUS			
		CH-A	RATIO	0 - 5.000	**1.000**
			DIREC.	+ / -	**+**
		CH-B	RATIO	0 - 5.000	**1.000**
			DIREC.	+ / -	**+**
		CH-C	RATIO	0 - 5.000	**1.000**
			DIREC.	+ / -	**+**
		CH-D	RATIO	0 - 5.000	**1.000**
			DIREC.	+ / -	**+**
MEASURE	M1	SELECT	ON		**ON**
			BAR	BOTTOM CENTER -10->0	**BOTTOM**
			B.FACT	-5.00 / +5.00	**1.00**
			RANGE	± 0.05" ± 0.01" ± 0.005" ± 0.001" ± 0.0005" ± 0.0001"	**± 0.05"**
			SENS.	± 0.01 ~ 5.000	**1.000**
			RESOL.	0.005, 0.001, 0.0005, 0.0001, 0.00005, 0.00002, 0.00001	**0.00005"**
			FUNC	A, B, C, D, A+B, A-B, C+D, (A+B)-C, (A+B+C)/3, (A+B+C+D)/4 (A+B)-(C+D)	**A**
			MODE	STATIC, MAXIMUM, MINIMUM,(M+m)/2, (M-m)/2, M-m	**STATIC**
SPEC.	M1	NOMI.	000.0000		**0.00000**
		-TOLER.	-0.0000		**-0.05**
		+TOLER	+0.0000		**+0.05**
		-APPRO	-0.0000		**-0.05**
		+APPRO	+0.0000		**+0.05**
MASTER	M1	-MASTER	+0.0000		**+0.0000**
		+MASTER	+0.0000		**+0.0000**
CLASS	SELECT	OFF / ON			**OFF**
		NUMBER	1 - 100		**010**
		START	+0.0000		**+0.00000**
		STEP	0.0000		**0.001**
RS232		SPEED	19200, 9600, 4800		**9600**
		DATA	7, 8		**8**
		PARITY	None,even,Odd		**None**
		TERM	CR,CRLF		**CRLF**
		RTS	ON / OFF		**ON**
		PRINT	BRIEF, FULL		**BRIEF**
		RSMODE	PRINT,HOST		**PRINT**
		ID NO.	000		**000**
ETC	GENERAL	UNIT	METRIC,INCH		**INCH**
		DISPLAY	Mm, um		**mm**
		INPUT	HBT,LVDT,CAP,AIR		**HBT**
		P/W	PROGRAM		**0000**
			CALIBR.	ON/OFF	**OFF**
	AVERAGE	BAR	000		**005**
		DIGIT	000		**005**
		A/D	00		**20**
	VERSION				**V2.xx**

6.2 **APPLICATION EXAMPLES**
6.3 **DIAMETER/THICKNESS**



<Initialisation>

<Specification of the measure>

External diameter : 10.000 mm
Lower tolerance : - 20μm
Upper tolerance: +20μm
Lower warning limit: - 15μm
Upper warning limit: +15μm
Lower master : 9.980 mm
Upper master : 10.020 mm
Unit : mm

Menu	Sub-menu	Selection	Function	Choice	Values
CHANNEL	SOURCE	EXT.			EXT.
		CH-BUS			
		CH-A	RATIO	0 - 5.000	1.000
			DIREC.	+ / -	**+**
		CH-B	RATIO	0 - 5.000	1.000
			DIREC.	+ / -	**+**
		CH-C	RATIO	0 - 5.000	1.000
			DIREC.	+ / -	+
		CH-D	RATIO	0 - 5.000	1.000
			DIREC.	+ / -	+
MEASURE	M1	SELECT	ON		ON
			BAR	BOTTOM CENTER -10->0	**CENTER**
			B.FACT	-5.00 / +5.00	1.00
			RANGE	± 1.0mm ± 0.5mm ± 0.1mm ± 0.05mm ± 0.01mm ± 0.005mm	**± 0.05mm**
			SENS.	± 0.01 ~ 5.000	1.000
			RESOL.	0.01, 0.005, 0.001, 0.0005, 0.0002, 0.0001	0.001
			FUNC	A, B, C, D, A+B, A-B, C+D, (A+B)-C, (A+B+C)/3, (A+B+C+D)/4 (A+B)-(C+D)	**A+B**
			MODE	STATIC, MAXIMUM, MINIMUM,(M+m)/2, (M-m)/2, M-m	STATIC
SPEC.	M1	NOMI.	000.0000		**010.000**
		-TOLER.	-0.8000		**-0.0200**
		+TOLER	+0.0000		**+0.0200**
		-APPRO	-0.0000		**-0.0150**
		+APPRO	+0.0000		**+0.0150**
MASTER	M1	-MASTER	+00.0000		**+9.9800**
		+MASTER	+00.0000		**+10.0200**
CLASS	SELECT	OFF / ON			OFF
		NUMBER	1 - 100		010
		START	+00.0000		+00.0000
		STEP	0.0000		0.0100
RS232		SPEED	19200, 9600, 4800		9600
		DATA	7, 8		8
		PARITY	None,even,Odd		None
		TERM	CR,CRLF		CRLF
		RTS	ON / OFF		ON
		PRINT	BRIEF, FULL		BRIEF
		RSMODE	PRINT,HOST		PRINT
		ID NO.	000		000
ETC	GENERAL	UNIT	METRIC,INCH		METRIC
		DISPLAY	mm, um		mm
		INPUT	HBT,LVDT,CAP,AIR		HBT
		P/W	PROGRAM		0000
			CALIBR.	ON/OFF	OFF
	AVERAGE	BAR	000		003
		DIGIT	000		003
		A/D	00		10
	VERSION				V2.00

6.4 **BLANK SETTING SHEET**

Application

<Specification of the measure>

Nominal size :
Lower tolerance:
Upper tolerance:
Lower warning limit:
Upper warning limit:
Lower master :
Upper master:
Unit : mm

<Initialisation>

Menu	Sub-menu	Selection	Function	Choice	Values
CHANNEL	SOURCE	EXT.			
		CH-BUS			
		CH-A	RATIO	0 - 5.000	
			DIREC.	+ / -	
		CH-B	RATIO	0 - 5.000	
			DIREC.	+ / -	
		CH-C	RATIO	0 - 5.000	
			DIREC.	+ / -	
		CH-D	RATIO	0 - 5.000	
			DIREC.	+ / -	
MEASURE	M1	SELECT	ON		
			BAR	BOTTOM CENTER -10->0	
			B.FACT	-5.00 / +5.00	
			RANGE	± 1.0mm ± 0.5mm ± 0.1mm ± 0.05mm ± 0.01mm ± 0.005mm	
			SENS.	± 0.01 ~ 5.000	
			RESOL.	0.01, 0.005, 0.001, 0.0005, 0.0002, 0.0001	
			FUNC	A, B, C, D, A+B, A-B, C+D, (A+B)-C, (A+B+C)/3, (A+B+C+D)/4 (A+B)-(C+D)	
			MODE	STATIC, MAXIMUM, MINIMUM,(M+m)/2, (M-m)/2, M-m	
SPEC.	M1	NOMI.	000.0000		
		-TOLER.	-0.8000		
		+TOLER	+0.0000		
		-APPRO	-0.0000		
		+APPRO	+0.0000		
MASTER	M1	-MASTER	+00.0000		
		+MASTER	+00.0000		
CLASS	SELECT	OFF / ON			
		NUMBER	1 - 100		
		START	+00.0000		
		STEP	0.0000		
RS232		SPEED	19200, 9600, 4800		
		DATA	7, 8		
		PARITY	None,even,Odd		
		TERM	CR,CRLF		
		RTS	ON / OFF		
		PRINT	BRIEF, FULL		
		RSMODE	PRINT,HOST		
		ID NO.	000		
ETC	GENERAL	UNIT	METRIC,INCH		
		DISPLAY	mm, um		
		INPUT	HBT,LVDT,CAP,AIR		
		P/W	PROGRAM		
			CALIBR.	ON/OFF	
	AVERAGE	BAR	000		
		DIGIT	000		
		A/D	00		
	VERSION				

Chapter 7. General

7.1 TROUBLE SHOOTING

Default	Actions
The digital display & LED display are off.	Check the power(AC 110) Check the fuse(2A) Check the power switch(ON) position
The digital display is off.	Reset the column.(“Enter” key + Power ON)
The digital display & LED display are not moving.	Check the probe position Check the connection of probe & column. Check the connection of main board & analog board.
The function M2, M3, M4 do not work	The functions M2, M3, M4 must be turned ON at MEASURE menu.
The calibration is refused “OVER MINIMUM”	One or a few data are not compatible between the specification values and the master values.

7.2 MAINTENANCE

Please do not forget that this measuring instrument must be treated with care.

Take notice that this “User’s manual” is in relation with the software version V.2.00.

Please do not hesitate to contact us if you need further assistance.

Menu Map for PC2200(V2.xx)

BN20914